

PATENT APPLICATION  
Docket No. 14321.67

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	)
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Nobuhiro Nunoya et al.	)
	)
Serial No.:	10/527,355 ) Art Unit
	) 2828
Filing Date:	March 7, 2005 )
	)
Confirmation No.:	4938 )
	)
For:	OPTICAL SEMICONDUCTOR DEVICE AND )
	OPTICAL SEMICONDUCTOR INTEGRATED )
	CIRCUIT )
	)
Examiner:	Patrick Stafford )
	)

RESPONSE TO OFFICE ACTION

Commissioner for Patents  
PO Box 1450  
Alexandria, Virginia 22313-1450

Examiner:

Applicant submits this paper in response to the Office Action mailed November 19, 2007.  
Reconsideration is respectfully requested in view of the following remarks.

A. Background

Claims 1-10, 12, 14-16, and 50-54 were pending in the application at the time of the Office Action. The Office Action rejected claims 1-10, 12, 14-16, and 50-54 as being obvious over cited art. By this response Applicant has not cancelled, amended, or added any claims. As such, claims 1-10, 12, 14-16, and 50-54 are again presented for the Examiner's consideration in light of the following remarks.

B. Rejection of the Claims

Pages 2-10 of the Office Action reject claims 1-7, 9, 10, 14-16, and 50-54 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,501,776 to Numai ("Numai") in view of U.S. Patent No. 6,580,740 to Funabashi et al. ("Funabashi") and further in view of U.S. Patent No. 5,155,737 to Ikeda et al. ("Ikeda"). Pages 10-12 of the Office Action reject claims 8 and 12 as being unpatentable over the *Numai/Funabashi/Ikeda* combination further in view of U.S. Patent No. 4,583,227 to Kirkby ("Kirkby") (claim 8) or U.S. Patent No. 5,719,974 to Kashyap ("Kashyap") (claim 12). Applicant respectfully traverses these rejections.

Applicant notes that similar obviousness rejections of claims 1-10, 12, 14-16, and 50-54 based on the cited references were set forth in the prior Office Action dated June 28, 2007 ("Prior Office Action"). After receiving an Advisory Action rejecting earlier arguments, Applicant traversed the rejections set forth in the Prior Office Action in a subsequent response dated October 29, 2007 ("Prior Response"). However, in the outstanding Office Action, the Examiner has failed to address the arguments set forth by Applicant in the Prior Response. Instead, the Examiner has simply repeated the earlier rejection *verbatim*, except for a few additional paragraphs added by the Examiner directed to amendments made to claims 2, 5, 9, and

10 by the Applicant in the Prior Response. None of these additional paragraphs take note of or answer the substance of any of the Applicant's arguments.

Applicant submits that such an approach to examination is clearly inconsistent with established examination guidelines. Particularly, Applicant notes that “[w]here the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, *take note of the applicant's argument and answer the substance of it.*” MPEP § 707.07(f). *Emphasis added.* Because the Examiner has failed to do this, Applicant submits that the prior arguments remain valid.

For example, Applicant set forth arguments in the Prior Response why it would not be obvious to use the grating allegedly disclosed in *Ikeda* with the *Numai/Funabashi* combination. Specifically, Applicant argued in the Prior Response that:

... none of the cited references, alone or in combination, discloses, teaches or suggests widening a temperature compensation range in a semiconductor laser whose temperature dependence is adjusted by the propagating region. Further, none of the references, alone or in combination, discloses, teaches or suggests the use of a grating having a high coupling coefficient in the semiconductor laser whose temperature dependence is adjusted by the propagating region in order to achieve wide temperature compensation range. Also, as noted in the September 11<sup>th</sup> response, *Ikeda* does not disclose, teach or suggest the use of a grating having a high coupling coefficient in the gain region

In general, a grating having a high coupling coefficient is not used for a semiconductor laser, since it has poor wavelength stability. Therefore, a person skilled in the art would not, without a compelling reason, try to use a grating having a high coupling coefficient. Although *Ikeda* appears to include a grating having a high coupling coefficient, as cited by the Examiner, please note this grating is used in addition to a grating having a low coupling coefficient which in fact determines the wavelength selectivity and thus ensures the wavelength stability.

In the present invention, a grating having a high coupling coefficient greater than 300 cm<sup>-1</sup> is used in the gain region, but not in the propagating region nor the reflection region. Because of this structure, a wider temperature compensation range is achieved, while avoiding

problems related to the grating having a high coupling coefficient. For example, if such grating were not disposed in the gain region, the grating might be required in the reflection region. Due to the poor wavelength stability of the grating, however, a shorter cavity would likely be required to achieve the required wavelength selectivity, which would result in a shorter gain region, thus limiting the gain obtained in the gain region. By having the grating in the gain region, this problem can be circumvented so that the cavity can be made shorter without sacrificing the gain obtained in the gain region.

Furthermore, by having the grating in the gain region, higher design flexibility is achieved. For example, by having the grating in the gain region, a contribution of the propagating region in the laser can independently be determined. The stop bandwidth, which determines a temperature compensation range, is determined by the coupling coefficient of the grating, whereas the phase in the cavity which determines the oscillation wavelength is determined by the sum of the length of the propagating region and the effective length of the grating. Accordingly, the phase characteristic can be determined by the length of the propagating region, while the stop bandwidth can be independently determined by the grating in the gain region. This would not be possible if the grating was formed in the propagating region.

While these distinctions still apply, the Office Action fails to acknowledge Applicant's arguments or explain why the Examiner is not persuaded by the arguments.

In view of the foregoing, Applicant respectfully submits that for at least the same reasons given in the Prior Response, it would not be obvious to arrive at the presently claimed inventions by combining the cited references in the manner set forth in the Office Action. Accordingly, Applicant respectfully requests that the obviousness rejection with respect to claims 1-10, 12, 14-16, and 50-54 be withdrawn.

No other objections or rejections were set forth in the Office Action.